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Exploring the use of Earth-observation data for risk assessment of arsenic contaminated groundwater

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Arsenic poisoning through consumption of naturally contaminated water forms a global health threat, which affects millions of people. Delineating regions at risk of contaminated groundwater is a crucial requirement in mitigation of this natural hazard, as typical health symptoms often only become visible after long-term exposure. In our study we test the suitability of Earth-observation data in predicting areas at risk of arsenic contaminated groundwater in the Amazon Basin. It has been shown that high concentrations of arsenic in groundwater are often related with Holocene aquifers in floodplains and deltas of sediment-laden rivers. However, the occurrence and spatial extent of these aquifers is difficult to assess, especially in remote and poorly accessible regions, where groundwater analyses and reliable information on (hydro)geology is lacking. Hence, we evaluate the potential of SRTM-DEM data and Landsat imagery to help identify areas with a high hazard of higher arsenic concentration. We link patterns of measured groundwater arsenic concentrations with available remote sensing data for different geological settings along the Amazon River and its tributaries. Based on these small-scale case studies, we determined the efficacy of using these remote sensing data at various resolutions and the possibilities of upscaling, as well as the validity of snapshots imagery for a dynamic river system.